APPENDIX D

FIRE SUPPORT TEAM VEHICLE

D-1. INTRODUCTION

This appendix presents a general description of the FISTV. Operating procedures and additional technical information on the M981 FISTV are in TM 9-2350-266-10.

D-2. DESCRIPTION

The M981 FISTV is built on an M113A2 chassis which includes an upgraded suspension and electrical system, The design is derived from the M901 improved TOW vehicle (ITV). Its hydraulically erected missile launcher is modified to house the targeting station, Subsystems of the targeting station include the G/VLLD, DMD, FIST DMD, and communications equipment, They can be used as a part of the vehicle or removed from the vehicle and used in other applications. The storage for components allows equipment to be quickly dismounted for ground operations.

D-3. FUNCTIONAL DESCRIPTION

The following are the functions of the FISTV:

- Perform systems tests. It tests its internal functioning the functioning of the LD/R and north-seeking gyrocompass (NSG), and all associated circuitry.
- Provide controls for LD/R and NSG power, systems initialization, erection and stowage of the targeting head, lamp and LD/R reticle brightness, lamps test, and remote setting of PRF codes of the LD/R.
- Store vehicle and target-known point location.
- Compute target coordinates based on vehicle location and data determined by the LD/R (slant distance) and NSG (direction and vertical angle).
- Compute vehicle coordinates based on a known point location and data provided by the LD/R (slant distance) and NSG (direction and vertical angle).
- Store and send polar data to the FIST DMD.
- Provide direction and vertical angle data to the LD/R eyepiece display.
- Display vehicle heading or targeting head direction and vertical angle.

D-4. FISTV OPERATIONS STATIONS

The operations stations of the FISTV are the targeting, communications, and observation stations,

a. Targeting Station. The targeting station consists of three major components: the turret, the erection arm assembly, and the targeting head. The targeting station can rotate 6,400 mils (360°) in either direction in azimuth. The **turret** houses the targeting station operator's controls and indicators. These include the targeting station control display (TSCD), the hand controls, the night-sight controls, and the hydraulic components that supply the motive power for the entire targeting station. The **erection arm assembly** erects the targeting head for target location or designation and stows the head for travel. The **targeting head** houses the LD/R component of the G/VLLD, the night sight, the wide field of view (3X) sight, and the NSG. It can be elevated to + 37° (657 mils) and depressed to –23° (408 mils). The targeting head must be erect for target location and designation equipment to be used.

(1) North-Seeking Gyrocompass. The NSG determines true north and converts the azimuth to a grid direction based on the vehicle position. The NSG module also measures the vertical angle to the target (based on the horizontal plane). This is used by the TSCD to convert the G/VLLD slant range to a horizontal distance when computing vehicle or target location.

(2) Tank Periscope. The tank periscope assembly allows the targeting station operator to select one of three sights:

- The wide field of view sight (3X channel) provides a wide (2.8 x 25°) field of view. This sight is not intended for use in adjustment of fire; therefore, it does not have a mil reticle.
- The night-sight channel provides either a wide (4 x 6.6°) or a narrow (12 x 2.2°) field of view.
- The sight LD/R (13X channel) with a 12 x 4° field of view has the same eyepiece display as the G/VLLD.

b. Communications Station. The communications station includes the FIST DMD AN/PSG-5. It allows digital communications with current systems such as the TACFIRE, the BCS, the MBC, and the DMD AN/PSG-2.

Security for voice communications is provided by the TSEC KY-57 COMSEC device. The FIST DMD and components of the AN/VRC-88 radio sets are man-portable and can be operated away from the vehicle.

(1) The communications system in the FISTV is extensive. It gives all four personnel both internal and external communications capabilities as follows:

- The FISTV has four-frequency FM capability for external communications. The radios and the FIST DMD are located at the communications stations and may be used for voice or digital operations.
- The FISTV also has an internal intercom system. This allows the crew to converse during operations.

(2) Each crew member has a combat vehicle crewman's (CVC) helmet. The CVC helmet has a headset, a microphone, and a keying switch. The helmet hooks into an intercommunications control unit. This unit allows each crewman to talk within the communications system. Each individual can monitor from one to four radio frequencies and the intercom. Also, each member can communicate over any one of these nets by properly positioning the TALK switch on his control unit.

c. Observation Station. This station contains a four-power, 7° (125 mils) field of view periscope for use in target detection and vehicle defense. The optical system includes a mil reticle pattern as an aid for the adjustment of conventional fires. The reticle also contains an azimuth position indicator, which provides direction relative to the front of the vehicle. No leveling capability is provided.

D-5. OBSERVED FIRE PROCEDURES

Target location and burst location data are in polar form. Therefore, when the FISTV is used, accurate vehicle location is critical in the determination of accurate target or burst locations.

a. Determining Vehicle Location. Until the FISTV is equipped with a position locating reporting system (PLRS), the FIST is limited to map spotting and/or using existing on-board systems in determining vehicle location.

(1) Survey Function. The FIST DMD can determine the FIST location on the basis of polar data measured from either one known point or two known points. The one known point method requires direction, distance, and vertical angle. The two known point method requires only direction and vertical angle to both known points.

(2) Calculate Function. The TSCD contains a microprocessor that enables it to perform several functions. One of these functions is to determine vehicle location from one known point on the basis of polar data. (See TM 9-2350-266-10.)

b. Target Location.

(1) With an accurate vehicle location determined, the FIST can locate targets very accurately with the targeting station and its components. The NSG provides grid azimuth and vertical angle to the target, while the LD/R provides slant distance.

(2) Once the targeting station operator has determined laser-polar data to the target, there are three methods available to the FIST through which target location can be determined and/or transmitted to the FDC.

(a) FR LASER Format. As soon as the laser fire trigger on the targeting station hand controls is squeezed, direction (grid azimuth), slant distance, and vertical angle to the target are not only entered into the memory of the TSCD but are automatically sent to the FIST DMD. When the FR LASER message format is displayed by the DMD operator, direction, distance, and vertical angle will have been entered into the appropriate fields of the message format by the FIST DMD. Once the remaining required entries are made, the message may be transmitted to the FDC.

(b) FIST DMD Polar Convert Function. The FIST DMD can convert laser-polar data to grid coordinates. Once the required entries are made in an FR LASER format (as discussed in the preceding paragraph), the DMD operator can use the FIST DMD to convert those data to a grid by displaying an FR GRID format. All appropriate entries previously made in the FR LASER format are transferred automatically to the FR GRID format. The request may then be transmitted to the FDC.

(c) TSCD Calculate Function. The TSCD not only calculates vehicle location (as described previously) but also calculates the target coordinates on the basis of vehicle location and polar data to the target. Once the targeting station operator squeezes the laser fire triggers and determines polar data to the target, he can use the TSCD to determine grid coordinates to the target. (See TM 9-2350-266-10.) These coordinates are then relayed to the DMD operator. He brings up the appropriate message format, makes the required entries, and transmits the message to the FDC.

c. Determining Subsequent Corrections. Once the call for fire has been transmitted and ADJ FIRE has been selected in the CONTROL field of the DMD format, the targeting station operator must be prepared to spot and locate the burst or bursts of the adjusting rounds. In

preparing to observe the burst, the 3X channel of the image transfer assembly (ITA) must be used. This gives the targeting station operator a much wider field of view than the 13X channel and, therefore, a better chance to spot the burst. Once the burst is acquired and centered in the 3X reticle, the operator selects the 13X channel, centers the burst in the reticle, and lases the burst. Corrections from the burst are determined in the same manner as with the G/VLLD in the ground mode. If the fire request was transmitted by use of the FR LASER format, the SA LASER format must be used for subsequent corrections. If the FR GRID format was used, then the SUBQ ADJ message format must be used for corrections.

D-6. RESPONSIBILITIES AND DUTIES OF THE FIST

When the FIST operates as one element, the company FSO assigns responsibilities for manning the vehicle stations to team members. All members of the FIST headquarters must be able to perform all of the duties inherent with each station in the vehicle.